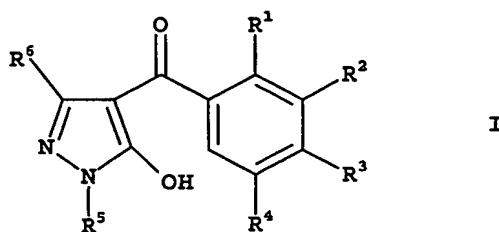


We claim:

1. A synergistic herbicidal mixture comprising

5 A) at least one 3-heterocyclyl-substituted benzoyl derivative of the formula I



10 in which the variables have the following meanings:

R^1 , R^3 are halogen, C_1-C_6 -alkyl, C_1-C_6 -haloalkyl, C_1-C_6 -alkoxy, C_1-C_6 -haloalkoxy, C_1-C_6 -alkylthio, C_1-C_6 -alkylsulfinyl or C_1-C_6 -alkylsulfonyl;

15 R^2 is a heterocyclic radical selected from the group: isoxazol-3-yl, isoxazol-4-yl, isoxazol-5-yl, 4,5-dihydroisoxazol-3-yl, 4,5-dihydroisoxazol-4-yl and 4,5-dihydroisoxazol-5-yl, it being possible for the six radicals mentioned to be unsubstituted or mono- or polysubstituted by halogen, C_1-C_4 -alkyl, C_1-C_4 -alkoxy, C_1-C_4 -haloalkyl, C_1-C_4 -haloalkoxy or C_1-C_4 -alkylthio;

25 R^4 is hydrogen, halogen or C_1-C_6 -alkyl;

R^5 is C_1-C_6 -alkyl;

R^6 is hydrogen or C_1-C_6 -alkyl;

30 or one of its environmentally compatible salts;

and

B) two herbicides selected from the group including imazapyr, imazaquin, imazamethabenz-methyl, imazamox, imazapic and imazethapyr;

5 or one of its environmentally compatible salts;

and, if desired,

10 C) at least one herbicidal compound from the group of the acetyl-CoA carboxylase inhibitors (ACC), acetolactate synthase inhibitors (ALS), amides, auxin herbicides, auxin transport inhibitors, carotenoid biosynthesis inhibitors, enolpyruvylshikimate 3-phosphate synthase inhibitors (EPSPS), glutamine synthetase inhibitors, lipid biosynthesis inhibitors, mitosis inhibitors, protoporphyrinogen IX oxidase inhibitors, photosynthesis inhibitors, synergists, growth substances, cell wall biosynthesis inhibitors and a variety of other herbicides;

15 20 in a synergistically effective amount.

25 2. A synergistic herbicidal mixture as claimed in claims 1, comprising, as component A), a 3-heterocyclyl-substituted benzoyl derivative of the formula I, where R¹ is hydrogen.

30 3. A synergistic herbicidal mixture as claimed in any of claims 1 to 2, comprising, as component A), a 3-heterocyclyl-substituted benzoyl derivative of the formula I, where

R¹ is halogen, C₁-C₆-alkyl or C₁-C₆-alkylsulfonyl;

R³ is halogen or C₁-C₆-alkylsulfonyl;

35 4. A synergistic herbicidal mixture as claimed in any of claims 1 to 3, comprising, as component A), a 3-heterocyclyl-substituted benzoyl derivative of the formula I, where

R² is a heterocyclic radical selected from the group: isoxazol-3-yl, isoxazol-5-yl and 4,5-dihydroisoxazol-3-yl, it being possible for the three radicals mentioned to be unsubstituted or mono- or polysubstituted by halogen, C₁-C₄-alkyl, C₁-C₄-alkoxy, C₁-C₄-haloalkyl, C₁-C₄-haloalkoxy or C₁-C₄-alkylthio.

5 5. A synergistic herbicidal mixture as claimed in any of claims 1 to 4, comprising, as component A), a 3-heterocyclyl-10 substituted benzoyl derivative of the formula I, where

10 R² is isoxazol-5-yl, 3-methyl-isoxazol-5-yl, 4,5-dihydroisoxazol-3-yl, 5-methyl-4,5-dihydroisoxazol-3-yl, 5-ethyl-4,5-dihydroisoxazol-3-yl or 4,5-dimethyl-15 4,5-dihydroisoxazol-3-yl.

20 6. A synergistic herbicidal mixture as claimed in any of claims 1 to 5, comprising, as component A), 4-[2-chloro-3-(4,5-dihydroisoxazol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-pyrazole.

25 7. A synergistic herbicidal mixture as claimed in any of claims 1 to 5, comprising, as component A) 4-[2-methyl-3-(4,5-dihydroisoxazol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-pyrazole.

8. A synergistic herbicidal mixture as claimed in any of claims 1 to 7, comprising as component B) imazapyr and imazethapyr.

30 9. A synergistic herbicidal mixture as claimed in any of claims 1 to 7, comprising as component B) imazapic and imazapyr.

35 10. A synergistic herbicidal mixture as claimed in any of claims 1 to 7, comprising, three active ingredients, a 3-heterocyclyl-substituted benzoyl derivative of the formula I (component A) as claimed in claims 1 to 7 and imazapyr and imazethapyr (component B).

11. A synergistic herbicidal mixture as claimed in any of claims 1 to 7, comprising, three active ingredients, a 3-heterocyclyl-substituted benzoyl derivative of the formula I (component A) as claimed in claims 1 to 7 and imazapic and 5 imazapyr (component B).

12. A synergistic herbicidal mixture as claimed in any of claims 1 to 7, comprising, at least four active ingredients, a 3-heterocyclyl-substituted benzoyl derivative of the formula I 10 (component A) as claimed in claims 1 to 7; two herbicides selected from the group including imazapyr, imazaquin, imazamethabenz-methyl, imazamox, imazapic and imazethapyr (component B) as claimed in claims 1;

15 and

C) at least one herbicidal compound from the group of the acetyl-CoA carboxylase inhibitors (ACC), acetolactate synthase inhibitors (ALS), amides, auxin herbicides, auxin transport inhibitors, carotenoid biosynthesis inhibitors, 20 enolpyruvylshikimate 3-phosphate synthase inhibitors (EPSPS), glutamine synthetase inhibitors, lipid biosynthesis inhibitors, mitosis inhibitors, protoporphyrinogen IX oxidase inhibitors, photosynthesis inhibitors, synergists, growth substances, cell wall biosynthesis inhibitors and a variety of other herbicides.

13. A synergistic herbicidal mixture as claimed in claim 1 or 12 30 comprising, as component C), at least one herbicidal compound from the groups C1 to C16:

C1 acetyl-CoA carboxylase inhibitors (ACC): cyclohexenone oxime ethers, phenoxyphenoxypropionic esters or arylaminopropionic acids;

C2 acetolactate synthase inhibitors (ALS): imidazolinones, pyrimidyl ethers, sulfonamides or sulfonylureas;

5 C3 amides;

5 C4 auxin herbicides:

5 pyridinecarboxylic acids, 2,4-D or benazolin;

10 C5 auxin transport inhibitors;

10 C6 carotenoid biosynthesis inhibitors;

15 C7 enolpyruvylshikimate 3-phosphate synthase inhibitors
(EPSPS);

15 C8 glutamine synthetase inhibitors;

20 C9 lipid biosynthesis inhibitors:

20 anilides, chloroacetanilides, thioureas, benfuresate or
perfluidone;

25 C10 mitosis inhibitors:

25 carbamates, dinitroanilines, pyridines, butamifos,
chlorthal-dimethyl (DCPA) or maleic hydrazide;

30 C11 protoporphyrinogen IX oxidase inhibitors:

30 diphenyl ethers, oxadiazoles, cyclic imides or pyra-
zoles;

35 C12 photosynthesis inhibitors:

35 propanil, pyridate, pyridafol, benzothiadiazinones, di-
nitrophenols, dipyridylenes, ureas, phenols, chlorida-
zon, triazines, triazinones, uracils or biscarbamates;

40 C13 synergists:

40 oxiranes;

45 C14 growth substances:

45 aryloxyalkanoic acids, benzoic acids or quinolinecar-
boxylic acids;

C15 cell wall synthesis inhibitors:

C16 various other herbicides:

5 dichloropropionic acids, dihydrobenzofurans, phenylactic acids or aziprotryn, barban, bensulide, benzthiazuron, benzofluor, buminafos, buthidazole, buturon, 10 cafenstrole, chlorbufam, chlorofenprop-methyl, chloroxuron, cinmethylin, cumyluron, cycluron, cyprazine, cyprazole, dibenzyluron, dipropetryn, dymron, egliazin-ethyl, endothall, ethiozin, flucabazole, fluorbentranil, flupoxam, isocarbamid, isopropalin, karbutilate, mefluidide, monuron, napropamide, napropanilide, 15 ntralin, oxaciclomefone, phenisopham, piperophos, procyzine, profluralin, pyributicarb, secbumeton, sulfalate (CDEC), terbucarb, triazofenamide, triaziflam or trimeturon;

or their environmentally compatible salts.

20 14. A synergistic herbicidal mixture as claimed in claims 1 or 12, comprising, as component C), at least one herbicidal compound from the groups C1 to C16:

C1 acetyl-CoA carboxylase inhibitors (ACC):

25 - cyclohexenone oxime ethers:
alloxydim, clethodim, cloproxydim, cycloxydim,
sethoxydim, tralkoxydim, butroxydim, clefoxydim or
tepraloxydim;

- phenoxyphenoxypropionic esters:
clodinafop-propargyl (and, if appropriate, cloquintocet), cyhalofop-butyl, diclofop-methyl,
fenoxyprop-ethyl, fenoxyprop-P-ethyl, fen-thiaproprop-ethyl, fluazifop-butyl, fluazifop-P-butyl,
haloxyfop-ethoxyethyl, haloxyfop-methyl, haloxyfop-P-methyl, isoxapryifop, propaquizafop, quizalofop-ethyl, quizalofop-P-ethyl or quizalofop-tefuryl; or

- arylaminopropionic acids:
flamprop-methyl or flamprop-isopropyl;

C2 acetolactate synthase inhibitors (ALS):

- imidazolinones:
imazapyr, imazaquin, imazamethabenz-methyl, imazamox, imazapic or imazethapyr;
- pyrimidyl ethers:
pyrithiobac-acid, pyrithiobac-sodium, bispyribac-sodium, KIH-6127 or pyribenzoxym;
- sulfonamides:
florasulam, flumetsulam or metosulam; or
- sulfonylureas:
amidosulfuron, azimsulfuron, bensulfuron-methyl, chlorimuron-ethyl, chlorsulfuron, cinosulfuron, cyclosulfamuron, ethametsulfuron-methyl, ethoxy-sulfuron, flazasulfuron, halosulfuron-methyl, imazosulfuron, metsulfuron-methyl, nicosulfuron, primisulfuron-methyl, prosulfuron, pyrazosulfuron-ethyl, rimsulfuron, sulfometuron-methyl, thifensulfuron-methyl, triasulfuron, tribenuron-methyl, triflusulfuron-methyl, N-[[[4-methoxy-6-(trifluoromethyl)-1,3,5-triazin-2-yl]amino]-carbonyl]-2-(trifluoromethyl)-benzenesulfonamide, sulfosulfuron or iodosulfuron;

C3 amides:

- allidochlor (CDAA), benzoylprop-ethyl, bromobutide, chlorthiamid, diphenamid, etobenzanid (benzchlomet), fluthiamide, fosamin or monalide;

C4 auxin herbicides:

- pyridine carboxylic acids:
clopyralid or picloram; or
- 2,4-D or benazolin;

C5 auxin transport inhibitors:

- naptalame or diflufenzopyr;

C6 carotenoid biosynthesis inhibitors:

5 - benzofenap, clomazone (dimethazone), diflufenican, fluorochloridone, fluridone, pyrazolynate, pyrazoxyfen, isoxaflutole, isoxachlortole, mesotrione, sulcotrione (chlormesulone), ketospiradox, fluramine, norflurazon or amitrol;

10 C7 enolpyruvylshikimate-3-phosphate synthase inhibitors (EPSPS):

10 - glyphosate or sulfosate;

15 C8 glutamine synthetase inhibitors:

15 - bilanafos (bialaphos) or glufosinate-ammonium;

20 C9 lipid biosynthesis inhibitors:

20 - anilides:

20 anilofos or mefenacet;

20 - chloroacetanilides:

20 dimethenamid, S-dimethenamid, acetochlor, alachlor, butachlor, butenachlor, diethatyl-ethyl, dimethachlor, metazachlor, metolachlor, S-metolachlor, pretilachlor, propachlor, prynachlor, terbuchlor, thenylchlor or xylachlor;

25 - thioureas:

25 butylate, cycloate, di-allate, dimepiperate, EPTC, esprocarb, molinate, pebulate, prosulfocarb, thiobencarb (benthiocarb), tri-allate or vernolate; or

25 - benfuresate or perfluidone;

30 C10 mitosis inhibitors:

30 - carbamates:

30 asulam, carbetamid, chlorpropham, orbencarb, pronamid (propyzamid), propham or tiocarbazil;

35 - dinitroanilines:

35 benefin, butralin, dinitramin, ethalfluralin, fluchloralin, oryzalin, pendimethalin, prodiamine or trifluralin;

35 - pyridines:

35 dithiopyr or thiazopyr; or

- butamifos, chlorthal-dimethyl (DCPA) or maleic hydrazide;

C11 protoporphyrinogen IX oxidase inhibitors:

- 5 - diphenyl ethers:
acifluorfen, acifluorfen-sodium, aclonifen, bifenox, chlornitrofen (CNP), ethoxyfen, fluorodifen, fluoroglycofen-ethyl, fomesafen, furyloxyfen, lactofen, nitrofen, nitrofluorfen or oxyfluorfen;
- 10 - oxadiazoles:
oxadiargyl or oxadiazon;
- cyclic imides:
azafenidin, butafenacil, carfentrazone-ethyl, cinidon-ethyl, flumiclorac-pentyl, flumioxazin, flumipropyn, flupropacil, fluthiacet-methyl, sulfentrazone or thidiazimin; or
- 15 - pyrazoles:
ET-751, JV 485 or nipyrapaclofen;

20 C12 photosynthesis inhibitors:

- propanil, pyridate or pyridafol;
- benzothiadiazinones:
bentazone;
- 25 - dinitrophenols:
bromofenoxim, dinoseb, dinoseb-acetate, dinoterb or DNOC;
- dipyridylenes:
cyperquat-chloride, difenzoquat-methylsulfate, diquat or paraquat-dichloride;
- 30 - ureas:
chlorbromuron, chlorotoluron, difenoxuron, dimefuron, diuron, ethidimuron, fenuron, fluometuron, isoproturon, isouron, linuron, methabenzthiazuron, methazole, metobenzuron, metoxuron, monolinuron, neburon, siduron or tebuthiuron;
- 35 - phenols:
bromoxynil or ioxynil;
- chloridazon;

- triazines:
ametryn, atrazine, cyanazine, desmetryn, di-methamethryne, hexazinone, prometon, prometryn, propazine, simazine, simetryn, terbumeton, terbutryne, terbutylazine or trietazine;
- triazinones:
metamitron or metribuzine;
- uracils:
bromacil, lenacil or terbacil; or
- biscarbamates:
desmedipham or phenmedipham;

C13 synergists:

- oxiranes:
tridiphane;

C14 growth substances:

- aryloxyalkanoic acids:
2,4-DB, clomeprop, dichlorprop, dichlorprop-P (2,4-DP-P), fluoroxypryn, MCPA, MCPB, mecoprop, mecoprop-P, or triclopyr;
- benzoic acids:
chloramben or dicamba; or
- quinolinecarboxylic acids:
quinclorac or quinmerac;

C15 cell wall synthesis inhibitors:

- isoxaben or dichlobenil;

C16 various other herbicides:

- dichloropropionic acids:
dalapon;
- dihydrobenzofurans:
ethofumesate;
- phenylacetic acids:
chlorfenac (fenac); or
- aziprotryn, barban, bensulide, benzthiazuron, benzofluor, buminafos, buthidazole, buturon, cafenstrole, chlorbufam, chlorfenprop-methyl, chlo-

5 roxuron, cinmethylin, cumyluron, cycluron,
cyprazine, cyprazole, dibenzyluron, dipropetryn,
dymron, eginazin-ethyl, endothall, ethiozin, flu-
cabazole, fluorbentranil, flupoxam, isocarbamid,
isopropalin, karbutilate, mefluidide, monuron,
10 napropamide, napropanilide, nitralin, oxaciclo-
fone, phenisopham, piperophos, procyzazine, proflu-
ralin, pyributicarb, secbumeton, sulfallate
(CDEC), terbucarb, triazofenamid, triaziflan or
trimeturon;

or their environmentally compatible salts.

15. A synergistic herbicidal mixture as claimed in 12, comprising,
15 as component C), at least one herbicidal compound from

the groups C9 or C12 as defined in claim 12.

20. A synergistic herbicidal mixture as claimed in claim 12
comprising, as component A) 4-[2-methyl-3-(4,5-dihydroisoxa-
zol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-
pyrazole; as component B) two herbicides selected from the
group including imazapyr, imazaquin, imazamethabenz-methyl,
imazamox, imazapic and imazethapyr; and as component C) a
herbicidal compound from the group C9.

25. A synergistic herbicidal mixture as claimed in claim 12
comprising, as component A) 4-[2-methyl-3-(4,5-dihydroisoxa-
zol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-
pyrazole, as component B) imazapyr and imazethapyr or ima-
30 zopic and imazapyr, and as component C) a chloroacetanilide.

35. A synergistic herbicidal mixture as claimed in claim 12 com-
prising, as component A) 4-[2-methyl-3-(4,5-dihydroisoxa-
zol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-
pyrazole, as component B) imazapyr and imazethapyr as compo-
nent C) acetochlor.

19. A synergistic herbicidal mixture as claimed in claim 12 com-
prising, as component A) 4-[2-methyl-3-(4,5-dihydroisoxa-

zol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-pyrazole, as component B) imazapic and imazapyr, and as component C) acetochlor.

5 20. A synergistic herbicidal mixture as claimed in claim 12 comprising, as component A) 4-[2-methyl-3-(4,5-dihydroisoxazol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-pyrazole; as component B) two herbicides selected from the group including imazapyr, imazaquin, imazamethabenz-methyl, 10 imazamox, imazapic and imazethapyr; and as component C) a herbicidal compound from the group C12.

15 21. A synergistic herbicidal mixture as claimed in claim 12 comprising, as component A) 4-[2-methyl-3-(4,5-dihydroisoxazol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-pyrazole, as component B) imazapyr and imazethapyr, and as component C) a benzothiadiazine or a triazine.

20 22. A synergistic herbicidal mixture as claimed in claim 12 comprising, as component A) 4-[2-methyl-3-(4,5-dihydroisoxazol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-pyrazole, as component B) imazapyr and imazethapyr, and as component C) bentazone.

25 23. A synergistic herbicidal mixture as claimed in claim 12 comprising, as component A) 4-[2-methyl-3-(4,5-dihydroisoxazol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-pyrazole, as component B) imazapyr and imazethapyr as component C) atrazine.

30 24. A synergistic herbicidal mixture as claimed in claim 12 comprising, as component A) 4-[2-methyl-3-(4,5-dihydroisoxazol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-pyrazole, as component B) imazapic and imazapyr, and as component C) a benzothiadiazine or a triazine.

35 25. A synergistic herbicidal mixture as claimed in claim 12 comprising, as component A) 4-[2-methyl-3-(4,5-dihydroisoxazol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-

pyrazole, as component B) imazapic and imazapyr, and as component C) bentazone.

26. A synergistic herbicidal mixture as claimed in claim 12
5 comprising, as component A) 4-[2-methyl-3-(4,5-dihydroisoxazol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-pyrazole, as component B) imazapic and imazapyr as component C) atrazine.
- 10 27. Synergistic herbicidal mixture as claimed in any of claims 1 to 26, wherein component A) and B) are present in a weight ratio of 1:0.001 to 1:500.
- 15 28. Synergistic herbicidal mixture as claimed in any of claims 12 to 26, wherein component A) and component C) are present in a weight ratio of 1:0.002 to 1:800.
- 20 29. A herbicidal composition comprising a herbicidally active amount of a synergistic herbicidal mixture as claimed in any of claims 1 to 28, at least one inert liquid and/or solid carrier and, if desired, at least one surfactant.
- 30 30. A process for the preparation of herbicidal compositions as claimed in claim 29, wherein component A), component B), if desired, component C), at least one inert liquid and/or solid carrier and, if appropriate, a surfactant are mixed.
- 35 31. A method of controlling undesired vegetation, which comprises applying a synergistic herbicidal mixture as claimed in any of claims 1 to 28 before, during and/or after the emergence of undesired plants, it being possible for the herbicidally active compounds of components A), B) and, if desired, C) to be applied simultaneously or in succession.
32. A method of controlling undesired vegetation as claimed in claim 31, wherein the leaves of the crop plants and of the undesired plants are treated.